*V. Unclassed Powders.*

| Analyst's Number. | Brand. | Carbonic-Acid Gas, Per Cent. | Cubic Inches Carbonic-Acid Gas, Per Ounce. | Remarks. |
|---|---|---|---|---|
| 6 | Silver Prize..... | 8.14 | 75.3 | Shows potash and ammonia re-actions, and reduces silver abundantly. |
| 22 | Orange..... | 8.00 | 74.0 | Contains a soluble alumina compound. |
| 18 | Our Best..... | 6.15 | 56.9 | Shows ammonia re-actions; contains much soluble sulphate and some free tartaric acid. |

Professor Cornwall says, in conclusion, "Our investigations show, that, while especially the higher grades of cream-of-tartar and acid-phosphate-of-lime powders are maintained at a quite uniform standard of excellence, the State is flooded, also, with many baking-powders of very poor quality, — cheap goods, poorly made. Of the thirty-nine brands examined, twenty-five contain alum or its equivalent, in the shape of some soluble alumina compound; eight are cream-of-tartar powders, with small quantities of other ingredients in several cases; four are acid-phosphate-of-lime powders; two belong properly under none of the above classes.

"With one exception, the powders containing alum all fall below the average strength of the cream-of-tartar powders, and in the majority of cases they fall much below the better grades of the cream-of-tartar powders.

"In the cream-of-tartar and the acid-phosphate-of-lime powders, no indications of substances likely to be injurious to health, in the quantities used, have been found.

"More evidence against the use of alum in baking-powders might have been presented, but it would have been of a similar nature to that which has already been given. In the writer's opinion, the presence of alum in baking-powders is objectionable, since, under certain conditions, it may exert an injurious effect on the digestion. The effects may not be very marked in the case of any individual consumer; but that they can be induced to a greater or less extent, seems to be well established.

"There appears to be ample ground for requiring that the makers of baking-powders should publish the ingredients used in their powders, in order that the consumer, who may justly have doubts of the desirability of using certain kinds, may be protected. At present the only guaranty of an undoubtedly wholesome and efficient article appears to be the name of the brand.

"Moreover, since it is quite possible to put up the baking-powders in such a way as to preserve their strength very thoroughly, and since it is evident that many makers fail in this respect, it would not seem unreasonable to require that baking-powders should not be sold unless they will yield a certain percentage of carbonic-acid gas. The bad effects of the 'heavy food' prepared with some of the baking-powders among our samples must certainly be felt by those who use them, and who are yet too ignorant to know where the trouble lies. It is for this class especially that nearly all legislation relating to securing good food and drugs is enacted.

"Since it is evident that some of the alum-powders are so prepared as to increase the extent of any injurious effect, owing to the mixture of ingredients whose combination cannot be justified on any grounds, it is recommended that a special and more thorough examination of such be made, with a view to preventing their manufacture."

## THE MINERAL WEALTH OF BRITISH COLUMBIA.

IN 1877, Mr. George M. Dawson prepared, in connection with the Canadian Government Surveys for the Canadian Pacific Railway, a general note on the mines and minerals of economic value of British Columbia, which was published in the "Railway Survey Report" for that year, and was afterwards reprinted, with some additions, in the "Report of Progress of the Geological Survey for 1877–78." Since that time great changes have occurred in respect to the aspects of mining in British Columbia, and important additions have been made to our knowledge of its mineral resources and geology. In view of these, and the increasing interest now manifested in the development of the natural resources of the province, and the numerous inquiries constantly received on that subject, it appeared to be desirable to place the available information respecting its mineral wealth in the hands of the public in a summarized form. With this object in view, Dr. Dawson began the revision of the publication first referred to, but soon found, that, in order to obtain a reasonably satisfactory result, it would be necessary practically to rewrite the whole. The work has in consequence assumed proportions larger than were at first contemplated, and now appears as "The Mineral Wealth of British Columbia" (Montreal, Dawson Brothers), with an annotated list of localities of minerals of economic value.

The object of this publication is twofold. It is, in the first place, intended to serve in some measure as an exponent of the mineral wealth of the province to which it refers; to provide an answer of a general kind to the inquiries now so frequently made on this subject; and to collect for this purpose, in a convenient form, brief summaries of the facts contained in the several official reports on the geological features of the province, with specific references to the pages in which they are treated of at greater length. In the second place, it is designed to place in the hands of the "prospector" or miner a convenient synopsis of facts, with a list of localities likely to be of interest to him. In the endeavor to carry out this second purpose, it has been considered advisable to add notes on such general principles, and to advance such suggestions, as, from the study of the geological features of the province (dating from 1874), appear to be of importance, and likely to be of service at the present time in guiding the search for or exploitation of its metalliferous deposits. In further pursuance of this object, some facts resulting from late practice and investigations in other mining regions are alluded to, and their application to the problems of development in British Columbia is briefly noted.

While the important developments now in progress in the province appear to call for the present publication, it is to be anticipated that within a short time any thing that can now be said regarding vein-mining will be relegated to a position of merely historical interest.

The province of British Columbia, with an area of 390,344 square miles, includes a length of over 800 miles of the Cordillera belt of the West Coast, — a region of mountains and of geological disturbance, which, in this part of its extent, between the Pacific Ocean and the elevated western margin of the Great Plains, has a breadth averaging about 400 miles. This great mountain region extends north-westward and south-eastward, and constitutes the effective cause which has produced the similar trend of the Pacific coast between the same parallels of latitude. It represents the northern continuation of the most important metalliferous area of the United States, essentially repeating its main orographic features, though presenting also some notable differences of a general kind, as well as many local peculiarities.

The Cordillera belt, in British Columbia, may be described as comprising four great mountain systems or principal axes of uplift and geological disturbance, which are, in the main, nearly parallel to each other and to the coast, — the Rocky, the Gold, the Coast, and the Vancouver ranges.

The Rocky Mountain range proper is the farthest inland, and has an average breadth, in its southern part, of about sixty miles, but is decreased near the Peace River to forty miles or less, and apparently loses its importance and regularity locally where cut through by the Liard, though recovering both still farther to the north-westward. Near the 49th parallel, several summits occur in this range which exceed 10,000 feet in height; but northward few attain this elevation till the headquarters of the Bow River are reached. About the sources of the North Saskatchewan and Athabasca, the range appears to culminate, and Mounts Brown and Murchison occur, with reputed heights of 16,000 and 13,500 feet respectively. Near the Peace, few summits exceed 6,000 feet, so far as known. Though more or less extensive snow-fields occur in many

places, true glaciers are found only about the heads of the Bow, North Saskatchewan, and Athabasca. Some of the valleys penetrating this range on the east are lightly timbered or in part prairie-like in character, but as a rule the mountains are thickly wooded wherever sufficient soil exists for the support of trees; and, owing to the greater rainfall on the western slopes of the range, the forests are there often very dense.

Crystalline schists and granite are scarcely known in any part of the Rocky Mountains between the 49th and 60th parallels, the ranges being built up chiefly of a great series of paleozoic rocks, extending from the Cambrian to the carboniferous, with a total thickness of more than 28,000 feet in the Bow River region. There are also, however, more or less isolated basins of rocks of cretaceous age, which rocks were evidently at one time continuous with those of the same age in the eastern foot-hills and Great Plains. In these basins, beds of bituminous coal and of anthracite are found. Deposits of copper ores and of galena are so far the most important metalliferous minerals discovered in association with the older rocks of this mountain system.

The south-western side of the Rocky Mountain range is defined by a very remarkable, straight, and wide valley, which can be traced uninterruptedly from the 49th parallel to the head waters of the Peace, — a distance of 700 miles or more. This valley is occupied by the upper portions of several of the largest rivers, including the Kootanie, Columbia, Fraser, Parsnip, and Finlay. Gold-placers have been found and worked at a number of points along this valley, and important discoveries of various ores are now being made in its vicinity near the Upper Columbia and Upper Kootanie. It is naturally adapted to become a main line of communication between the southern and northern portions of the province, near its eastern boundary.

The next mountain system to the south-west of the Rocky Mountains is referred to under the general name of the "Gold Range," though really a complex and somewhat irregular mountainous belt, which includes several more or less distinct and partly overlapping ranges. The Purcell, Selkirk, and Columbia[1] ranges constitute its southern part, while to the north it is represented by the Cariboo Mountains, and still farther northward — after an important interruption — by the Omenica and Cassiar Mountains. These mountains are, generally speaking, less rugged in detail than the Rocky Mountains, including extensive areas of high, rolling plateau country, and supporting in their southern and more massive portion numerous glaciers and wide snow-fields. The highest summit so far actually measured is Mount Donald, on the line of the Canadian Pacific Railway, 10,645 feet. The forests of the Purcell, Selkirk, and Columbia ranges are dense and tangled; and these mountains are much more difficult to traverse, and even less perfectly explored, than the corresponding portion of the Rocky Mountains. Granites and crystalline schists of great age are abundant in the Gold Range, together with great masses of paleozoic rocks, respecting the structural relations of which very little is as yet known.

The Gold Range, as a whole, doubtless constitutes the most important metalliferous belt of the province. The richest gold-fields are closely related to it, and discoveries of metalliferous lodes are reported in abundance from all parts of it which have been explored. The deposits already made known are very varied in character, including highly argentiferous galenas and other silver-ores and auriferous quartz veins.

Between the Gold and Coast Ranges lies a region, which, for purposes of description, has been named the "Interior Plateau of British Columbia," having an average width of one hundred miles and a mean elevation of about 3,500 feet. Its height, on the whole, increases to the south; while northward it falls gradually toward the group of large lakes and the low country about the head waters of the Peace. This has, over a considerable part of its area, been covered by widespread flows of basalt and other volcanic rocks in the later tertiary period. It is now traversed in various directions by a system of deep, trough-like valleys of erosion, generally occupied by streams and rivers. Water standing at an elevation of three thousand feet above the present sea-level would flood most of these, and would divide its surface into a number of islands, while a large tract of country about the 53d and 54th parallels of latitude would be completely submerged. In some places the plateau is pretty level and uniform, but many portions of it attain an elevation much exceeding the mean above stated; and it is usually only when broadly viewed, and in contrast with its bounding mountain ranges, that its character as a plateau is apparent. Its main area is practically closed to the north, about latitude 50° 30′, by the ends of several intercalated mountain ranges, in which many of the summits attain a height of 8,000 feet. Nearly coincident with the 49th parallel is a second transverse mountainous zone, formed in the same way, the only orographically important gap in which is that found in the vicinity of the Okanagan River. The southern portion of the Interior Plateau includes much open country, constitutes the best grazing region of British Columbia, and affords, besides, some good agricultural land. To the north, with increasing moisture, it becomes generally forested, but embraces large areas which are suitable for eventual agricultural occupation.

The tertiary rocks of the Interior Plateau hold in many places beds of lignite or of coal. Where not concealed by the later rocks, the formations preponderantly represented belong to the paleozoic age. These include very notable developments of materials originally volcanic in origin. The geological structure is scarcely less complex than that of the mountain regions, and much yet remains to be done toward its elucidation. The Interior Plateau also presents some important granitic areas, and, particularly toward its south-western border, limited basins of cretaceous rocks. As a metalliferous region, it is destined to take high rank, particularly, it is believed, in respect to the precious metals, though its ores are too varied in character to admit of description in a few words. Placer deposits of gold have been worked in a number of widely separated localities, and platinum is abundant in the Similkameen region.

The Cascade Range of Oregon and Washington is largely composed of erupted volcanic materials, to which its characteristic features are due, though these materials rest upon a basis of older rocks. Its course is north and south, and it is definitely terminated in the vicinity of the international boundary. Near the mouth of the Fraser River its place is taken by a new mountain system, geographically and geologically distinct, in the composition of which volcanic ejectamenta play no prominent part. This forms the third member of the Cordillera in British Columbia, and, under the name of the "Coast Ranges," pursues a direct north-westward course for over 900 miles, forming throughout this distance the bordering mountain-zone of the continent. The Coast Ranges have an average width of about one hundred miles, and consist of numerous constituent ridges and minor mountain-axes with varied trends, frequently separated by deep parallel and transverse valleys. The average altitude of the higher summits is between 6,000 and 7,000 feet, while some exceed 9,000 feet. Glaciers are of frequent occurrence, and large in size, in the northern portions of the Coast Ranges. The mountains are, as a rule, densely forested and extremely rugged, the flora of their seaward slopes being that characteristic of the West Coast, and co-ordinated with its great humidity, while on north-eastern flanks the forest resembles that of the inland ranges.

Geologically the Coast Ranges owe the greater part of their elevation to a period later than the cretaceous, of which formation patches are found in them at great heights. The rocks consist chiefly of gray granites and granitoid materials, with which are associated gneisses and other crystalline schists, as well as paleozoic rocks resembling some of those of the Interior Plateau. In association principally with the last-named rocks, gold-placers occur locally. Copper and iron ores are frequently found, and rich silver ores have been discovered.

The name "Vancouver Range" may be applied as a general one to the fourth great mountain-axis, which, in a partially submerged condition, appears in Vancouver and in the Queen Charlotte Islands, and is continued southward nearly to the Columbia River by the Olympian Mountains of Washington Territory. The islands of the Alaskan archipelago have, on the map, the appearance of constituting a northern continuation of the same mountain system; but they may be more appropriately regarded, from an oro-

[1] The name "Gold Range" is often specially applied to that here spoken of as the Columbia Range.

graphic point of view, as forming a partially submerged lateral expansion of the Coast Ranges. The highest mountain of Vancouver Island — Victoria Peak — reaches an elevation of 7,484 feet, while there is a considerable mountainous area in the centre of the island which surpasses 2,000 feet in average altitude. Several summits in the Queen Charlotte Islands exceed 4,000 feet.

The Vancouver Range, while still to a considerable extent formed of crystalline rocks like those of the Coast Ranges, is principally composed of stratified rocks of paleozoic and triassic age, and is flanked in places, both on Vancouver and on Queen Charlotte Islands, by cretaceous rocks, which are here important because of their coal-bearing character. The areas underlain by these rocks are in general comparatively low, and hilly rather than mountainous; while a large tract of level land, based upon the tertiary formation, occurs in the north-east part of the Queen Charlotte Islands. Gold-placers have been worked in several places on Vancouver Island, but few ever attained much importance. Iron, copper, and lead ores and gold-bearing quartz are also known to occur in connection with this mountain-axis; but up to the present time the coal deposits have proved to be vastly its most important feature.[1]

The general correspondence of that portion of the Cordillera belt included in British Columbia with that of the western portion of the United States, in some parts of which mining operations of the first importance have been in progress now for many years, has already been alluded to. No feature of the geology of the continent is more remarkable than the general persistence of certain zones of similar rocks in a direction coincident with that of the Cordillera itself, — a circumstance in part due to the original similarity in conditions of deposition of sediments, and in part to their equal participation, at a later date, in changes produced by like metamorphic agencies. The similarity thus observed, in a series of geological zones parallel to the general direction of the Pacific coast, is here more striking than the continuity of the constituent orographic uplifts of the mountain-belt, and contrasts very markedly with the diversity of rock-formations found to occur where this belt is crossed at right angles. While metalliferous deposits individually are inconstant, and even the best defined lodes can be followed, in the vast majority of cases, for but a moderate distance, their character is found to depend fundamentally upon that of the enclosing or adjacent rocks, in which, under the required local dynamic and other agencies, these deposits are found to recur with nearly identical features. It is not intended here to discuss the resemblances and differences of the various rock series met with in the corresponding region in the Western States with those of British Columbia; but it may be mentioned that the metalliferous districts of the province may with advantage be compared by the miner with those which have already been more fully developed in each corresponding portion of the Cordillera region to the south, and that from such rational comparisons useful indications may be derived in the present early stages of the development of the mines of British Columbia.

The Rocky Mountains proper, as previously defined, can scarcely be traced southward, with identical characters, farther than the main head waters of the Missouri, beyond which the eastern ranges of the Cordillera become more lax and irregular. The Gold Range may, however, be followed farther in a southerly direction, being continued by the Cabinet, Cour D'Alaine, and Bitter Root Mountains for about 300 miles. The Interior Plateau of British Columbia represents the Great Basin of Utah and Nevada, and the Great Plains of the Columbia, and combines to some extent the features of both; though differing markedly from the first in the fact that it is not here self-contained as to its drainage, and from the second in the diminished importance of its tertiary lava-flood. It has already been stated that the Coast Ranges of British Columbia are not continued to the south of the international boundary. They resemble the Sierra Nevada more closely than they do the Cascade Mountains of Washington Territory and Oregon, and hold a similar relation to the interior basin with that held by the Sierra. While, however, the Sierra owes its elevation to a time immediately antedating the cretaceous, the main uplift of the Coast Ranges of British Columbia occurred at or after the close of that period. The Vancouver Range, again, dating from the same period with the last, is not traceable south of the Columbia River, beyond which, in Oregon and California, the Pacific is bordered by a range of coast-hills, which, from a geological point of view, are of very recent origin.

In California the principal auriferous territory coincides with the run of a certain belt of slaty and schistose rocks, which occurs on the western flank of the Sierra Nevada; these rocks being referred, by their contained fossils, to the triassic and cretaceous divisions of the geological scale. In British Columbia, while rocks of triassic age are largely developed, and in some cases with characters identical with those of the Californian gold-bearing rocks, no such persistent belt of these rocks is found in connection with the Coast Ranges, where (from what has just been said of the resemblance of the two mountain systems) it might, from analogy, have been sought for. While local occurrences of rich gold-placers are known, in association with slates probably of triassic age, on both sides of the Coast Ranges, the main auriferous territory in the province is found to align itself on the Gold Range; and the original deposits of gold, from which the placers have been supplied, are already known to exist in different series of rocks widely separated in age, and ranging all the way from the triassic to the Cambrian. While, therefore, there is no single well-developed gold-producing region, as in California, the area and mass of the rocks throughout which deposits of gold may be hopefully looked for are here greatly increased. The circumstances would also warrant the belief that the mode of occurrence of gold in its original matrix might differ from that found to the south, and in particular that this might be more varied. So far as investigation has gone, such a belief appears to be well grounded, and it would seem that to a very considerable extent the natural laws of this mining-field must be worked out independently.

In correspondence with the absence of the tertiary coast-hills of California, in which, under peculiar conditions of mineralization, the cinnabar ores of that State are developed, it is observable that in British Columbia no really important deposits of mercury have yet been discovered. It is by no means improbable that mercury ores may yet be developed in the province; but, if so, it cannot be in any continuation of the Californian cinnabar belt, and the conditions of such deposits may be expected to prove unlike.

Another and very important point of diversity is found as respects the cretaceous rocks of the southern and northern coast regions. In California and Oregon the mineral fuels which have been found and worked are lignites of tertiary age and of an inferior value. Similar fuels are known on the coast of British Columbia: but the rocks of the cretaceous here assume the *rôle* of a coal-bearing series, and yield coals of excellent quality, which more than hold their own in competition with all other fuels employed on the Pacific.

Still another noteworthy circumstance of difference, and one which is applicable to practically the entire area of the province when it is contrasted as a whole with the Pacific States, is that which has been produced by the general spread and movement of ice over this region during the glacial period. The changes thus effected in the distribution of surface materials, and directions of drainage, have most important bearings on the question of placer mining. They have also encumbered the surface of considerable tracts with "drift" deposits, which, while tending to produce a more fertile soil, largely conceal the indications to which the prospector generally trusts in more southern latitudes. At the same time, a great part of the oxidized upper portions of metalliferous veins, together with the atmospherically decayed country-rock associated with these, has been removed; thus often obscuring the outcrops of such veins, which would otherwise be well marked, and in the treatment of certain classes of ores rendering it necessary to begin work from the first with machinery and processes which in some other regions are only required after considerable depths have been attained.

[1] In connection with the foregoing outline of the ruling physical and geological features of the province, it should be stated, that while these features are moderately well known in the southern portion of the province, and as far northward as the 56th degree of latitude, and while in connection with the Yukon expedition some accurate information has been obtained for the extensive northern portion, there yet remains a large region, chiefly included between the 56th and 58th parallels, which, though touched upon here and there by the gold-miner, is yet almost unknown geographically and geologically.

These conditions, brought about by action during the glacial period, are among those which, in Dr. Dawson's opinion, have most tended heretofore to retard the development of metalliferous mining in British Columbia. Other circumstances which have operated in the same direction are, the densely wooded character of a great part of the country; the fact that the rivers are suited for navigation only in detached reaches; the remoteness from the coast of the richest and best-known placer-mining districts; and the cost of labor, supplies, and machinery, which may be regarded as in part concomitants, in part direct results, of these. Owing to the inaccessibility of the country, it has, till very recently, been prospected and exploited by the placer-miner alone, who has been deterred by no difficulty from reaching the most remote spots in which rumor, or reasoning of his own, lead him to expect the existence of the precious metal. Little knowledge or effort was expended in the search for metalliferous veins. Many such deposits supposed to be of value, were, it is true, located, and time and money which could ill be spared often uselessly spent upon them, leading only to discouragement. Even where the indications met with were altogether favorable, the original discoverer generally found that the capital and knowledge required for their development were not at his command, and it was difficult to interest those capable of dealing with such mines in a region which they could not easily visit and become familiar with at first-hand. With regard at least to the whole southern portion of the province, however, all this is now happily changed.

While speaking of causes which have hitherto stood in the way of vein-mining, it must also be mentioned that not the least important of these has been, and still is, the fictitious or exaggerated value too frequently placed upon entirely undeveloped discoveries. While it is manifestly right that the discoverer should be properly remunerated, it should be remembered that a mere surface showing, however promising, generally requires the expenditure of a large sum before its true value can even be ascertained, and that till thus developed it is unreasonable to expect a large payment for any mining claim.

In preceding paragraphs particular attention has been drawn to certain notable differences between the better-known and more fully developed regions of the southern part of the Pacific slope and those of the province of British Columbia, chiefly as a note of caution against the rash assumption of complete uniformity in conditions too often made without due investigation. The salient fact of the general identity of the structural features of the Cordillera region south and north, however, remain, and is such, that from this alone, even without taking into consideration the numerous and important discoveries already made, we should be justified in predicting an eventual great development of metalliferous mining in the province. It has already been stated that British Columbia includes a length of over 800 miles of the most important metalliferous belt of the continent; and, adding to this the northern extension of the same belt beyond the 60th parallel, we find that within the boundaries of Canada its entire length is between 1,200 and 1,300 miles. This, as has elsewhere been noted, is almost precisely equal to the whole length of the same region included by the United States from the southern line of Canada to the northern boundary of Mexico; and Dr. Dawson, after having enjoyed exceptional opportunities of investigation, feels no hesitation in recording his belief that the northern moiety of the Cordillera will ultimately prove to be susceptible of a development corresponding in importance to that which has already been attained in the southern.

British Columbia first rose from the position of a fur country to the rank of a colony, on the discovery of gold upon the Lower Fraser in 1858. Its subsequent history for a number of years is substantially that of the sudden rise and subsequent slow decline in importance of placer gold-mining. Coal-mining has, however, concurrently advanced, slowly but steadily, till it has obtained its present pre-eminent position. Such historical facts as appear to be important to the appreciation of these industries are touched on later in connection with them. With respect to vein-mining proper, we have as yet to chronicle merely the first steps; but in the southern part of the province the completion of the Canadian Pacific Railway has at length afforded the necessary impetus in this direction, and it is very gratifying to find, as an immediate consequence, that this part of the country is rapidly beginning to prove its valuable character, and to justify the confidence which those best able to form an opinion on the subject have always felt and frequently expressed. Every thing which has been ascertained of the geological character of the province as a whole, tends to the belief, that, so soon as similar means of travel and transport shall be extended to what are still more inaccessible districts, these also will be discovered to be equally rich in minerals, particularly in the precious metals, gold and silver. In the southern district, for which information is most complete, praiseworthy efforts are now in progress, at a number of widely separated localities, toward the exploitation of ores, which, in many cases, have already been proved to be of an exceptionally valuable character. Here, at least, there is every reason to believe that we are on the point of witnessing the inauguration of an era of mining activity of the most important kind.

## AMONG THE PUBLISHERS.

THE *Journal of Morphology* for June, being the first number of Vol. III. (Boston, Ginn), contains the following articles, besides eight lithographic plates: "The Actiniaria of the Bahamas," by Playfair McMurrich; "Contributions to the Osteology of the North American Passeres," "Notes on the Anatomy of Speotyto," by R. W. Shufeldt; "Variation of the Spinal Nerves in the Caudal Region of the Domestic Pigeon," by James I. Peck. The second number, that for August, will contain "The Mechanical Origin of the Structures of the Hard Parts of the Mammalia," by E. D. Cope; "The Embryology of Blatta and Doryphora," by William M. Wheeler; besides numerous cuts and seven lithographic plates. For the third number, the "Embryology of Linnbricus," by E. B. Wilson, is promised, and a paper by William Patten, dealing with the general embryology, including the segmental sense-organs, of arthropods. This number will probably be issued in October. A fourth number will probably be given with this volume, but its contents cannot be definitely stated. The subscription price is nine dollars for the volume, whether including three numbers or four.

— We have just received the first part of Vol. I. of the new "Century Dictionary," published by The Century Company, New York. This number appears in a unique and attractive binding, embracing the letters from A to Appet, and will be a welcome addition to the library. The work will be completed in six volumes of four parts each.

## LETTERS TO THE EDITOR.

### Fog.

A GREAT deal of discussion has recently taken place on the properties of fog and its causes. One writer attributes the celebrated London fog to the cooling of the air by radiation from hillsides near the city, which air, flowing down, envelops the city. It has also been suggested that a cool northerly wind on the west side of a storm flows into the saturated air on the south side, and condenses fog. Again, over Newfoundland it is thought that a saturated current flows from the southward to cooler waters, often having ice floating in them, and thus produces fog. The objection to the first theory is, that the cause assigned could not develop a fog 500 or 1,000 feet thick. In the second case it seems plain that the cool north wind is always dry, and would quickly render the air unsaturated. In the last case, while the cause assigned might produce a fog just at sea-level, yet this would hardly be extensive enough, and it is probable that a calm is essential in fog-production.

Fog, it is admitted, is simply cloud composed of water-dust or solid minute spheres of water from $\frac{1}{7000}$ to $\frac{1}{1000}$ of an inch in diameter. It is supposed by some that a dust-particle must be a nucleus for each sphere. When we consider the billions of such spheres in a cubic inch of fog, we may well halt, and demand that the moisture in a few cubic feet of fog be evaporated, and the trillions of dust-particles massed under a microscope, where they certainly ought to be visible. The laboratory experiments advanced to prove this theory seem entirely inadequate, when we consider the extreme improbability of such an hypothesis.